1. (Original) A high speed, low cost, wide spectrum plant identifier apparatus adapted to be mounted on a farm vehicle for selectively identifying plants within a field by species and for selectively applying chemicals thereto for the purposes of reducing the chemical costs and the excessive chemical application which may otherwise result in pollution problems, said apparatus comprising:

a) a sensing device for receiving reflected light from a plant, said device including a diffraction element for separating the reflected light into segments of different wavelengths and a linear sensor array having elements positioned to receive the segments and to measure the relative magnitude of such segments to define a wide spectral distribution of the plant;

b) a digital identifier connected to said sensing device and having a memory for memorizing a spectral distribution of light representing a first plant species from the field, and additional memory for receiving a spectral distributions of other plants from the field and programmable logic circuitry;

c) said logic circuitry having a program to compare the reflected spectral distribution of other plants with the memorized spectral distribution of the first species and to provide an output indicating substantial similarity between the distributions for effecting selective application of chemicals to the plants of the first species as the associated farm vehicle traverses a field.

2. (Original) An apparatus as recited in Claim 1 in which said identifier comprises a Digital Signal Processor.

3. (Original) An apparatus as recited in Claim 1 in which said program includes the routine of making a regression analysis to determine the similarity between a first plant species

and the other plants.

4. (Original). An apparatus as recited in Claim 1 in which the logic circuitry includes a switch for modifying the degree of similarity to be detected between the spectral distributions.

5. (Cancelled – added to 6).

6. (Currently amended). A low cost, high speed spectral sensing method for collecting and wirelessly transmitting spectral information on the physical condition of an object in need of remote analysis of the condition and/or identity of the objects, said method comprising the steps of:

a) sensing the spectral distribution of a plurality of segments of wave lengths of light reflected by the object in need of remote analysis with a portable spectral apparatus;

b) electronically measuring the magnitude of the segments of the reflected wavelengths to define a wide spectral distribution of light received from said object;

c) wirelessly transmitting the spectral distribution to a remote readable electronic memory to facilitate said remote analysis of the object, and

d) ~~The method as recited in claim 5 which the~~ said portable spectral apparatus having ~~has~~ a target light means for aiming the apparatus at the object from which the light is to be reflected.

7. (Currently Amended). The method recited in Claim ~~5~~ 6 in which the spectral distribution is first converted to digital information prior to transmitting.

8. (Currently amended). A high speed, low cost apparatus for selectively identifying objects, including fluids and tissue, and their condition, from within a population; said apparatus comprising:

a) a sensing device for receiving reflected light from a sample object from the population, said device including a lens and diffraction device for separating the reflected light into a plurality of segments of wavelengths and for measuring the magnitude of the segments of reflected light to define a spectral distribution;

b) a digital identifier connected to said sensing device and having a memory for receiving and storing a spectral distribution of light representing the sample object from said population;

c) said digital identifier also having a memory for receiving and storing sequential spectral distributions from additional objects of the population;

d) said digital identifier having a low cost chip with logic circuitry specially programmed to compare the subsequent spectral distribution with the memorized spectral distribution and to provide an output indicating similarity between the distributions.

9. (Previously presented). An apparatus as recited in claim 8 in which said chip comprises a digital signal processor.

10. (Previously presented). A low cost, digital identifier apparatus for identifying similarities of spectral distributions of two objects, said apparatus comprising:

a) a micro controller;

b) said micro controller having electronic memory elements for receiving digital signals reflecting a first wide spectral distribution of light segments reflected from an object;

c) electronic memory elements for receiving digital signals reflecting spectral distribution of light segments from other objects; and

d) logic circuitry including memory containing instructions for a regression analysis program for enabling said micro controller to compare the first spectral distribution of light segments with the spectral distribution of another object and for generating an output signal reflecting the results of said comparison.

11. (Previously presented). An identifier apparatus as recited in claim 10 in which said micro controller and said logic circuitry comprise a Digital Signal Processor.

12. (Currently amended). In an apparatus as recited in claim 10 in which said micro controller ~~processor~~ can be programmed to generate an output signal upon calculation of different coefficients of correlation.

13. (Previously presented). A low cost, high speed method for facilitating evaluation of selected objects, said method comprising the steps of:

a) obtaining a spectral distribution of reflected light segments from at least one sample object of a population and converting same to electronic memory;

b) sequentially generating a spectral distribution of additional objects of a population and converting same to electronic memory;

c) comparing said spectral distribution of the additional objects with the distribution of said sample object with a low cost electronic controller chip programmed with at least one

correlation algorithm and coupled to said memories to achieve said low cost method and to produce an output signal of the similarity of said distributions.

14. (Previously presented). A method as recited in claim 13 in which the coefficient of correlation can be varied to provide an output signal for different degrees of similarity.

15. (Original). A method as recited in Claim 13 in which the degree of similarity required to generate the output signal can be increased or decreased.

16. (Cancelled).

17. (Currently amended). A portable apparatus for accumulation and wireless transmission of a spectral distribution of an object including tissue and fluids for early analysis and/or detection of their condition, said apparatus comprising:

a) a sensor array means for accumulating a plurality of charges reflecting a spectral color distribution of light wavelengths reflected by said object to be analyzed;

b) micro controller means for directing said plurality of charges reflecting said spectral color distribution to a port for wireless transmission to a remote analytical device for early analysis of the spectral distribution of light of said object to detect its physical condition,

c) said ~~An~~ apparatus ~~as recited in claim 17 in which~~ having an analog to digital converter ~~is~~ interposed between said array and said transmittal device for transmitting said distribution in digital form.

18. (Presently amended). A lightweight, portable device for collecting spectral information on agricultural plants in need of remote analysis and for electronically transmitting the information for remote analysis, said device comprising:

a) a housing having an opening for receiving reflected light from said agricultural plants in need of said remote analysis,

b) a diffraction device for receiving said light and for diffracting said light into a plurality of segments having different wavelengths,

c) an array means carried by the housing and aligned for receiving a plurality of spectral segments of light having different wavelengths and to generate voltages whose magnitude generally correlates to the intensity of said segments to define a spectral fingerprint; and,

d) a controller means associated with said array for transmitting~~, by segment,~~ the spectral fingerprint to an electronic memory for said analysis of the agricultural plant.

19. (Previously presented). An apparatus as recited in claim 18 in which said portable device has a target light means for aiming the apparatus at the agricultural plants.

20. (Previously presented). An apparatus as recited in claim 18 in which said controller means comprises a digital signal processor.

21. (Cancelled).

22. (Cancelled).

23. (Currently amended). A low cost, lightweight, sensing method for obtaining spectral information on the identity and/or physical condition of objects such as plants, fluids and/or tissue for subsequent analysis of their identity and/or physical condition, comprising the steps of :

a) sensing the spectral distribution of a plurality of wave lengths of light by segment reflected by the objects;

b) electronically measuring the magnitude of the segments of the reflected wave lengths to define a spectrum distribution of light received from said objects; and

c) wirelessly transmitting said spectral information to a readable electronic memory for said subsequent analysis and/or identification of said objects, and

d) ~~A method as recited in claim 21 in which~~ said spectral distribution ~~is~~ being sensed by a portable spectral apparatus having a target light for aiming the apparatus at ~~the~~ said object ~~plant, or tissue~~.

24. (Currently amended). A method as recited in claim ~~21~~ 23 in which said spectral distribution comprises at least 3 data points.

25. (Previously presented). A low cost method for comparing selected objects, said method comprising the steps of:

a) obtaining a spectral distribution of reflected light segments from ~~at~~ a representative of a sample species of a population;

b) sequentially generating a spectral distribution of additional species of a population;

c) comparing said spectral distribution of the additional species with the distribution of said representative with an electronic controller chip having an arithmetic logic unit specially programmed with a comparative algorithm to obtain said low cost method and producing an output signal when said distributions are substantially similar.

26. (Currently amended). A method as recited in claim ~~24~~ 25 in which said spectral distributions comprises at least three data points.

27. (Original). A method as recited in claim ~~24~~ 25 in which said spectral distributions are compared by a mathematical algorithm.

28. (Currently amended). A low cost apparatus for selectively identifying objects, including fluids and tissue, and their condition, from within a population; said apparatus comprising:

a) a sensing device for receiving reflected light from objects of a population, said device including a lens and diffraction device for separating the reflected light into a plurality of segments of wavelengths and for directing said segments upon an array for measuring the magnitude of the segments of reflected light to define a spectral distribution;

b) a digital identifier connected to said sensing device and having a memory for receiving and storing a spectral distribution of light representing a sample object from said population;

c) said digital identifier also having a memory for receiving and storing sequential spectral distributions from various objects of the population;

d) said digital identifier having logic circuitry programmed to compare the subsequent spectral distribution with the memorized spectral distribution and to provide an output indicating the results of the comparison of the distributions.

29. (Previously presented). An apparatus as recited in claim 28 in which said sensing device is calibrated such that the same segments of diffracted light wavelengths are repeatedly separated and diffracted upon substantially the same area of the array.

30. (Previously presented). An apparatus as recited in claim 28 in which said sensing device is aligned such that at least one segment of wavelengths of light is always diffracted upon the same area of the array.

31. (Previously presented). An apparatus as recited in claim 28 in which said spectral distribution comprises at least three data points.

32. (Previously presented). An apparatus as recited in claim 28 in which said logic circuitry comprises a digital signal processor.

33. (Currently Amended). A <u>portable</u> low cost sensing apparatus for obtaining a spectral distribution of an object, including plants, tissue and fluids, said apparatus including;

a) a <u>portable</u> sensing unit for receiving reflected light said object and having a diffraction device for separating the reflected light into segments~~ed~~ of different wave lengths;

~~b~~c) a linear array mounted in the path of said diffracted light for receiving the segments~~ed~~ of wave lengths and for electronically measuring the magnitude of thereof; and

~~e~~d) a target light ~~means positioned adjacent~~ associated with the sensing unit for emitting light upon the source of the reflected light for aiming the sensing unit at the object whose spectral distribution is being sought.

34. (Previously presented). A sensing apparatus as recited in claim 33 in which said target light is directed in the opposite direction of the reflected light.

35. (Previously presented). A wide spectrum image device comprising;

a) a housing receiving light from an object and having a diffraction device for separating the light into segments of different wave lengths;

b) a linear array positioned adjacent said housing for receiving the separated wavelength segments and for electronically recording the magnitude thereof as an image; and

c) an aiming device having a beam of light supported by the housing for pointing the housing towards the object from which the light is to be reflected.

36. (Previously presented). A wide spectrum image device as recited in claim 35 which includes an electronic identifier receiving the electronically recorded image from the array and for identifying at least one property of the object.

37. (Previously presented). A wide spectrum image device as recited in claim 36 in which said identifier comprises a digital signal processor that includes an A to D converter for converting the magnitude of the separated wave lengths to digital information

38. (Previously presented). A wide spectrum image device as recited in claim 36 in which said identifier is a micro processor programmed to run a regression analysis to determine the similarity between a first image and a second image.

39. (Previously presented). An image apparatus for selectively identifying objects, including fluids and tissue, and their condition, from within a population; said apparatus comprising:

a) a sensing device for receiving reflected light from an object of a population, said device including a diffraction element for separating the reflected light into a plurality of segments of wavelengths and an array receiving said reflected light for measuring the magnitude of the segments of reflected light to obtain a spectral distribution;

b) a digital identifier connected to said sensing device and having a memory for receiving and storing a spectral distribution of light representing the sample object from said population;

c) said digital identifier also having a memory for receiving and storing sequential spectral distribution from an additional object of the population;

d) said digital identifier having logic circuitry programmed to compare the subsequent spectral distribution of the object with the spectral distribution of the sample object and to provide an output indicating similarity between the distributions; and

e) an aiming light source for generating a beam of light to focus the digital identifier upon the desired target.

40. (Previously presented). An apparatus as recited in claim 39 in which said identifier comprises a digital signal processor.

41. (Previously presented). A low cost digital identifier apparatus for comparing spectral distributions, said device comprising:

a) electronic memory elements for receiving signals reflecting a first spectral distribution of reflected light segments;

b) electronic memory elements for receiving signals reflecting an additional spectral distribution of reflected light segments; and

c) logic circuitry in which said low cost apparatus comprises a controller chip with an arithmatic logic unit interconnected with said memory elements and containing an algorithm for a regression analysis for comparing the first spectral distribution of light segments with the additional spectral distribution of reflected light segments.

42. (Previously presented). A digital identifier apparatus as recited in claim 41 in which said controller chip and said memory elements comprises a Digital Signal Processor.

43. (Previously presented). A digital identifier apparatus as recited in claim 41 in which the apparatus has means for changing the coefficient of correlation of said regression algorithm.

44. (Previously presented). A digital identifier apparatus as recited in claim 41 in which the first spectral distribution is obtained from a data base.

45. (Previously presented). A digital identifier apparatus as recited in claim 41 in which the algorithm indicates the degree of dissimilarity between the two distributions.

46. (Cancelled).

47. (Previously presented). A low cost method for comparing selected objects, said method comprising the steps of:

a) generating a spectral distribution of reflected light segments in binary form from a first object;

b) sequentially generating a spectral distribution of reflected light segments in binary form of an additional object;

c) electronically comparing said spectral distribution of the additional object with the distribution of said first object using a low cost chip containing an arithmatic logic unit having an algorithm.

48. (Previously presented). A method as recited in claim 47 in which said chip comprises a micro controller and said algorithm includes a regression analysis.

49. (Previously presented). A method as recited in claim 47 in which said light segments in numerical form are generated by directing said light upon an array whose output is converted to a digital output for comparison.

50. (Currently amended). A method as recited in claim ~~47~~ 49 in which said light segments are directed upon said array by a lens.

51. (Previously presented). A low cost sensing device for objects, said device comprising:

a) an array for receiving reflected light from objects and for generating a plurality of signals indicating the intensity of the reflected light;

b) a comparator connected to said array for receiving signals from said array, said comparator having a regression algorithm for comparing the signals from the object with signals from a standard and for identifying the similarity between objects.

52. (Previously presented). A device as recited in claim 51 the correlation coefficient of the regression analysis can be changed to ascertain different degrees of similarity between the object and the standard.

53. (Previously presented). A device as recited in claim 51 the correlation coefficient of the regression analysis can be changed by a manual switch to ascertain different degrees of certainty of identification.